

WHAT IS CLAIMED IS:

1. A positioning system, comprising:
a movable portion supported for
movement along a reference plane;

5 a reaction force absorbing mechanism
for absorbing a propulsion reaction force to be
produced by motion of said movable portion; and
a motor movable element for propelling
said movable portion along the reference plane,

10 wherein a first distance between the
reference plane and a gravity center position of
said movable portion and a second distance between
the reference plane and a gravity center position
of said reaction force absorbing mechanism are
15 made substantially equal to each other and/or the
second distance and a third distance between the
reference plane and said motor movable element are
made substantially equal to each other.

20 2. A positioning system according to Claim
1, wherein said reaction force absorbing mechanism
comprises a stator of a motor for driving said
movable portion.

25 3. A positioning system according to Claim
1, wherein said reaction force absorbing mechanism
is adapted to move the reference plane.

4. A positioning system, comprising:

a movable portion supported for movement in two axial directions being

5 substantially orthogonal to each other along a reference plane;

an X movable member including said movable portion;

10 a Y movable member including said movable portion;

a first reaction force absorbing mechanism for absorbing a propulsion reaction force to be produced by motion of said X movable member in a first movement direction; and

15 a second reaction force absorbing mechanism for absorbing a propulsion reaction force to be produced by motion of said Y movable member in a second movement direction,

20 wherein a fourth distance between the reference plane and a gravity center position of said X movable member and a fifth distance between the reference plane and a gravity center position of said first reaction force absorbing mechanism are made substantially equal to each other, and a

25 sixth distance between the reference plane and a gravity center position of said Y movable member and a seventh distance between the reference plane

and a gravity center position of said second reaction force absorbing mechanism are made substantially equal to each other.

5 5. A positioning system according to Claim
4, wherein said X movable member includes a first
beam member for transmitting, to said movable
portion, a propulsion force for propelling said
movable portion in a first direction, and a first
10 motor movable element for propelling said movable
portion in the first direction.

 6. A positioning system according to Claim
4, wherein said Y movable member includes a second
15 beam member for transmitting, to said movable
portion, a propulsion force for propelling said
movable portion in a second direction, and a
second motor movable element for propelling said
movable portion in the second direction.

20 7. A positioning system according to Claim
4, wherein said X movable member includes said
movable portion, a second movable portion provided
on said movable portion, a first beam member for
25 transmitting, to said movable portion, a
propulsion force for propelling said movable
portion in a first direction, and a first motor

movable element for propelling said movable portion in the first direction.

8. A positioning system according to Claim
5 4, wherein said Y movable member includes said
movable portion, a second movable portion provided
on said movable portion, a second beam member for
transmitting, to said movable portion, a
propulsion force for propelling said movable
10 portion in a second direction, and a second motor
movable element for propelling said movable
portion in the second direction.

9. A positioning system according to Claim
15 7, wherein said second movable portion comprises a
fine-motion stage for adjusting a position and an
attitude of said movable portion.

10. A positioning system according to Claim
20 8, wherein said second movable portion comprises a
fine-motion stage for adjusting a position and an
attitude of said movable portion.

11. A positioning system, comprising:
25 a movable portion supported for
movement in two axial directions being
substantially orthogonal to each other along a

reference plane;

a first guide member for guiding said movable portion in a first direction;

5 a second guide member for guiding said movable portion in a second direction;

a first reaction force absorbing mechanism for absorbing a propulsion reaction force to be produced by motion of said movable portion in a first direction; and

10 a second reaction force absorbing mechanism for absorbing a propulsion reaction force to be produced by motion of said movable portion in a second direction,

15 wherein an eighth distance between the reference plane and a gravity center position of said first guide member and a ninth distance between the reference plane and a gravity center position of said first reaction force absorbing mechanism are made substantially equal to each other, and a tenth distance between the reference
20 plane and a gravity center position of said second guide member and an eleventh distance between the reference plane and a gravity center position of said second reaction force absorbing mechanism are
25 made substantially equal to each other.

12. A positioning system, comprising:

a movable portion supported for movement in two axial directions being substantially orthogonal to each other along a reference plane;

5 a first motor movable element for propelling said movable portion in a first direction along the reference plane;

a second motor movable element for propelling said movable portion in a second
10 direction along the reference plane;

a first reaction force absorbing mechanism for absorbing a propulsion reaction force to be produced by motion of said movable portion in the first direction; and

15 a second reaction force absorbing mechanism for absorbing a propulsion reaction force to be produced by motion of said movable portion in the second direction,

wherein a twelfth distance between the
20 reference plane and a gravity center position of said first motor movable element and a thirteenth distance between the reference plane and a gravity center position of said first reaction force absorbing mechanism are made substantially equal
25 to each other, and a fourteenth distance between the reference plane and a gravity center position of said second motor movable element and a

fifteenth distance between the reference plane and a gravity center position of said second reaction force absorbing mechanism are made substantially equal to each other.

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13. A positioning system, comprising:

a movable portion supported for movement in two axial directions being substantially orthogonal to each other along a reference plane;

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a first guide member for guiding said movable portion in a first direction; and

a first motor movable element for propelling said movable portion in a first direction along the reference plane,

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wherein an eighth distance between the reference plane and a gravity center position of said first guide member and a twelfth distance between the reference plane and said first motor movable element are made substantially equal to each other.

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14. A positioning system, comprising:

a movable portion supported for movement in two axial directions being substantially orthogonal to each other along a reference plane;

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a second guide member for guiding said movable portion in a second direction; and

a second motor movable element for propelling said movable portion in a second
5 direction along the reference plane,

wherein a tenth distance between the reference plane and a gravity center position of said second guide member and a fourteenth distance
10 between the reference plane and said second motor movable element are made substantially equal to each other.

15. A positioning system according to Claim 11, wherein at least one of said first guide
15 member and said second guide member includes a plurality of guiding elements spaced from each other with respect to a direction of the reference plane.

20 16. A positioning system according to Claim 11, wherein said first and second reaction force absorbing mechanisms include a stator of a motor for driving said movable portion.

25 17. A positioning system according to Claim 12, wherein said first and second reaction force absorbing mechanisms include a stator of a motor

for driving said movable portion.

18. An exposure apparatus, comprising:

an original positioning system for
5 holding an original and for moving the original to
a predetermined position and positioning the same
at the predetermined position;

a substrate positioning system for
holding a substrate and for moving the substrate
10 to a predetermined position and positioning the
same at the predetermined position; and

a projection optical system for
projecting a pattern of the original onto the
substrate,

15 wherein at least one of said original
positioning system and said substrate positioning
system comprises a positioning system as recited
in Claim 1.

20 19. A device manufacturing method,
comprising the steps of:

applying a photosensitive agent to a
substrate;

25 exposing the substrate by use of an
exposure apparatus as recited in Claim 18; and
developing the exposed substrate.